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REVIEWS.

OBSERVATIONS ON THE GLACIAL PHENOMENA OF LABRADOR AND MAINE, WITH A VIEW OF THE RECENT INVERTEBRATE FAUNA OF LABRADOR. By *A. S. Packard, Jr., M. D.* With two Lithographic Plates. (From the Memoirs of the Boston Society of Natural History, Vol. I. Part 2.) pp. 94, 4to. Boston, 1867.

The author gives a sketch of the topography and geology of the coast of Labrador, followed by a special account of the drift or glacial phenomena in Labrador and Maine, describing four epochs in the history of the post-tertiary, or quaternary period:—

1. The true glacial epoch, during which Labrador and New England stood five hundred or six hundred feet higher than at present, and huge glaciers extended down to the sea from the various water-sheds. New England and Labrador, in other words, presented along their seashores “a nearly solid front of glacial ice, at least rivalling in height and breadth the enormous glacier 1,000 feet thick, and 540 miles long, discovered by Sir James Ross, in the antarctic lands.”

2. *The Leda Clay*, or our common brickyard clays, during which epoch the land slowly sank, and the glaciers retreated up the valleys of the various water-sheds, leaving behind them the thick deposit of clay, gravel, and boulders which now covers the surface of New England. “During the slow and gentle submergence of the land ushering in this epoch, the crude moraine matter (heaps of stone and gravel borne upon the surface of the glaciers) was sorted into beds of regularly stratified clays one hundred to three hundred feet in thickness.” — “An arctic fauna and flora inhabited the coast between the sea and the low snow-line, and the flora and fauna which are now found only on our Alpine heights, or in cold, isolated spots on the coast of Maine and the Northern lakes, then peopled the surface of New England and Canada.”

3. “Period of raised Beaches (*Saxicava Sands*), during which the land emerged to its present elevation, and the fauna and flora assumed their existing relations. The close of this period witnessed the surface of New England covered by broad lakes and ponds, with vast rivers and extensive estuaries, and deep fiords cutting up the coast-line. Its scenic features must have resembled those of Labrador at the present day.”

4. The Terrace Epoch marks the period subsequent to the more general recession of the sea during the preceding period, when the estuaries and deep bays were contracting to their present size.

From the fossils found at various localities in Labrador, Canada, and

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New England, it is inferred that the distribution of marine animals on the shores of North-eastern America "was governed by the same laws as at the present day. In going southward from Labrador to New York the seas became warmer the more they came in contact with the heated waters of the Gulf Stream, whose influence was evidently exerted on the coast of New England during the Glacial Period." The climate of New England was not purely arctic, like that of Greenland, but rather subarctic like that of Labrador, while now it is much warmer, being "boreal," or north temperate.

These studies on surface geology have attracted and always will attract much attention. Especially interesting is the occurrence of fossils in our clay and sand deposits, and we beg our readers to carefully preserve all shells and bones and other remains which may be found in making excavations for roads or wells. We are liable to discover in these deposits the bones of the mastodon, the elephant, the walrus, bison, and various species of whales. It is not improbable that the horse will be found to have lived in New England during the Terrace Period, immediately succeeding the disappearance of glaciers, and in fact every thing is to be determined regarding the distribution of life during these dark ages, either immediately preceding or accompanying the appearance of man on the earth.

The work closes with a catalogue of the marine animals dredged along the coast of Labrador, with descriptions of over twenty new species. The plates are beautifully executed, illustrating rare and interesting fossils from the Leda clays, and living forms of shells, worms, and crustaceans, with a geological map of that portion of the coast visited by the author. — A. H.

THE QUARTERLY JOURNAL OF SCIENCE. London. October, 1867.

We run hastily through the October number. Mr. Alfred Wallace, in "Creation by Law," reviews the Duke of Argyll's "Reign of Law." A very attractive plate represents an imaginary species of Hawk-moth (*Sphinx*) fertilizing by moonlight the flowers of an orchid growing in the forests of Madagascar, whose long, slender nectary hangs down twelve inches. Wallace argues that "the splendor of the humming-birds, is directly connected with their very existence." The most gaily-colored males are preferred by the more homely females, "which would lead to the individuals so adorned having more than the average number of offspring," adding, that "Mr. Darwin has lately arrived at the wonderful generalization that flowers have become beautiful solely to attract insects to assist in their fertilization." He adds, "I have come to this conclusion from finding it an invariable rule, that when a flower is fertilized by the wind, it never has a gaily-